Notice of Allowability	Application No.	Applicant(s)	
	10/526,646	NAKATA ET AL.	
	Examiner	Art Unit	
	Thomas D. Alunkal	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Applicant's Remarks filed 7/6/07*.

2. ☒ The allowed claim(s) is/are *1-30*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER

Response to Arguments

Applicant's arguments, filed 7/6/07, with respect to claims 1-29 have been fully considered and are persuasive. The previous rejections of claims 1-29 have been withdrawn.

Allowable Subject Matter

Claims 1-30 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art (see cited references) taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the independent claims 1, 10, 15, 18, 22 and 25, in such a manner that a rejection under 35. U.S.C 102 or 103 would be proper.

Regarding claim 1, the prior art taken either singularly or in combination fails to anticipate or fairly suggest an optical head comprising: a semiconductor laser; an objective lens for focusing a light beam from the semiconductor laser onto an information recording medium; a light beam separator that is located between the semiconductor laser and the objective lens, includes interference regions for light that is reflected from the information recording medium and travels in a straight path and .+-.first-order diffracted light produced by information tracks of the information recording medium, and diffracts each of plural light beams in regions of the substantial interference regions, where an amount of light is changed by a change in a relative angle between the information recording medium and the objective lens and by a shift of the objective lens in a radial direction of the information recording medium; a light-

receiving element that receives the light beam that is reflected by the information recording medium and separated by the light beam separator, and converts the light beam to an electrical signal; and ***an arithmetic circuit that corrects a value of the electrical signal detected by the light-receiving element in accordance with a radial position signal corresponding to an amount of shift of the objective lens in the radial direction of the information recording medium, and detects the relative angle between the information recording medium and the objective lens or an amount of tilt of the information recording medium with respect to a predetermined reference plane***.

Regarding claim 10, the prior art taken either singularly or in combination fails to anticipate or fairly suggest an optical head comprising: a semiconductor laser; an objective lens for focusing a light beam from the semiconductor laser onto an information recording medium; a light beam reflection portion that reflects the light beam from the semiconductor laser and moves together with the objective lens; a light-receiving element that includes a light-receiving region for receiving the light beam reflected by the light beam reflection portion; and ***an arithmetic circuit that detects the amount of tilt of the objective lens with respect to a predetermined reference plane by using an electrical signal detected by the light-receiving element and a radial position signal corresponding to the amount of shift of the objective lens in the radial direction***.

Regarding claim 15, the prior art taken either singularly or in combination fails to anticipate or fairly suggest an optical head comprising: a semiconductor laser; an

objective lens for focusing a light beam from the semiconductor laser onto an information recording medium; a light beam separator that is located between the semiconductor laser and the objective lens and forms a plurality of light spots on the information recording medium; a light-receiving element that receives a light beam of each of the light spots reflected by the information recording medium, and converts received light to an electrical signal; and ***an arithmetic unit that calculates the electrical signal converted by the light-receiving element, and detects the relative angle between the information recording medium and the objective lens.***

Regarding claim 18, the prior art taken either singularly or in combination fails to anticipate or fairly suggest an optical head comprising: a semiconductor laser for emitting divergent light: an objective lens for focusing the divergent light from the semiconductor laser onto an information recording medium; ***a light beam reflection portion that reflects a portion of a light beam traveling substantially outside an effective light beam diameter of the objective lens onto the information recording medium***; a light-receiving element including at least two light-receiving portions, each of which receives the light beam that is reflected by the light beam reflection portion and then is reflected by the information recording medium; and ***an arithmetic unit that calculates the amount of light entering the light-receiving element, and detects the amount of tilt of the information recording medium with respect to a predetermined reference plane.***

Regarding claim 22, the prior art taken either singularly or in combination fails to anticipate or fairly suggest an optical head comprising: a semiconductor laser for

emitting divergent light; an objective lens for focusing the divergent light from the semiconductor laser onto an information recording medium; a collimator lens located between the semiconductor laser and the objective lens; ***a light beam reflection portion that reflects part of a light beam traveling substantially outside an effective light beam diameter of the objective lens or the collimator lens onto the information recording medium***; a light-receiving element including at least two light-receiving portions, each of which receives the light beam that is reflected by the light beam reflection portion and then is reflected by the information recording medium; and ***an arithmetic unit that calculates the amount of light entering the light-receiving element, and detects the amount of tilt of the information recording medium with respect to a predetermined reference plane***.

Regarding claim 25, the prior art taken either singularly or in combination fails to anticipate or fairly suggest an optical head comprising an optical head comprising: a semiconductor laser; an objective lens for focusing a light beam from the semiconductor laser onto an information recording medium; an objective lens drive for driving the objective lens; a voltage controller for applying a voltage to the objective lens drive so that the objective lens is driven in a focusing direction; a light-receiving element that receives a light beam reflected from the information recording medium and produces a focusing error signal; and ***an arithmetic unit that detects a relative position of the information recording medium with respect to a predetermined reference position in the focusing direction, and calculates at least one selected from the relative angle between the information recording medium and the objective lens, the***

amount of tilt, the amount of warping, and the cross-sectional shape of the information recording medium by using a driving signal applied to the objective lens drive by the voltage controller and a focusing error signal produced by the light-receiving element.

Dependent claims 2-9, 11-14, 16-17, 19-21, 23-24, and 26-30 are allowed with their respective base claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Katayama (US 6,804,180) discloses an optical head assembly includes a semiconductor laser 6, an objective lens 5 which focuses a laser beam onto a disk D, and a photodetector 9 adapted to receive reflected light from the disk D. The photodetector 9 includes light receiving elements 18 to 33 each of which individually receives light components of the reflected light from the disk D directed to regions on one side in the tangential direction T of the disk D and on both sides in the radial direction R thereof, light components of the reflected light from the disk D directed to regions on the other side in the tangential direction T of the disk D and intermediate in the radial direction R thereof, light components of the reflected light from the disk D directed to regions on one side in the tangential direction T of the disk D and intermediate in the radial direction R thereof, and light components of the reflected light from the disk D directed to regions on the other side in the tangential direction T of the disk D and on both sides in the radial direction R thereof. Katayama (US PgPub

2001/0036137) discloses an object of the present invention is to provide an optical head apparatus which are capable of detecting correctly a radial tilt of an optical recording medium, without allowing offsets in radial tilt signals, even when an objective lens is shifted in a radial direction. A beam emitted from a semiconductor laser is divided into 0th order main beam and .+-.1st order sub beams. The three beams are shifted in the radial direction of the disc. The three beams reflected from the disc are diffracted by a holographic element, and are received by a photo detector. With respect to the main beam and the sub beams, a radial tilt of the disc is detected on the basis of a difference between intensities of the main and sub beams diffracted from a plurality of regions of the holographic element. Matsubara et al (5,430,699) disclose an optical reading and writing device. Itakura et al (US 5,978,332) disclose a tilt detector and tilt correcting method. Chang et al (US 6,525,332) disclose a method for detecting and compensating disk tilt and apparatus. Ishibashi (US 5,523,989) disclose an optical disk drive having functions of detecting disk tilt from a diffraction pattern of track and compensating disk tilt with use of comatic lenses. Ishibashi et al (US 5,751,680) disclose an optical disk drive. Koike et al (US 5,216,649) disclose an optical head with a tilt correction servo mechanism.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Alunkal whose telephone number is (571)270-1127. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571)272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas Alunkal/
Examiner AU 2627

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